

Earthquake Restrainers (Contract No. C-64158)

The as-built drawings, which are contained in these CDs, are scanned from drawings of the existing structure for the convenience of the contractor and as a means to convey to the contractor the available information regarding the existing structure. It is to be understood that no claim is being made as to the accuracy or completeness of the said information and that the State of California or its officers or agents shall not be responsible for the manner in which the contractor interprets and uses this information or for the accuracy, currency or completeness of these scanned as-built drawings. The contractor shall be responsible to obtain, at the contractor's expense, any additional information that the contractor deems necessary for completely and accurately assessing the existing conditions of the structure. The contractor shall not be entitled to any compensation for any claim arising from inaccuracy or insufficiency of these as-built drawings or in anyway related to these drawings.

[1. Project Plan and Elevation](#)

[2. General Plan-W1 to E1](#)

[3. General Plan-E4 to E39](#)

[4. Restrainer Location Plan-YA1 to 4](#)

[5. Restrainer Location Plan-E17 to E22](#)

[6. Restrainer Location Plan-E23 to E28 \(L.D.\)](#)

[7. Restrainer Location Plan-E23 to E33 \(U.D.\)](#)

[8. Restrainer Location Plan-E33 to E39](#)

[9. Restrainer Type 1](#)

[10. Restrainer Details-Type I & Type III](#)

[11. Restrainer Type II](#)

[12. Restrainer Details-Type II](#)

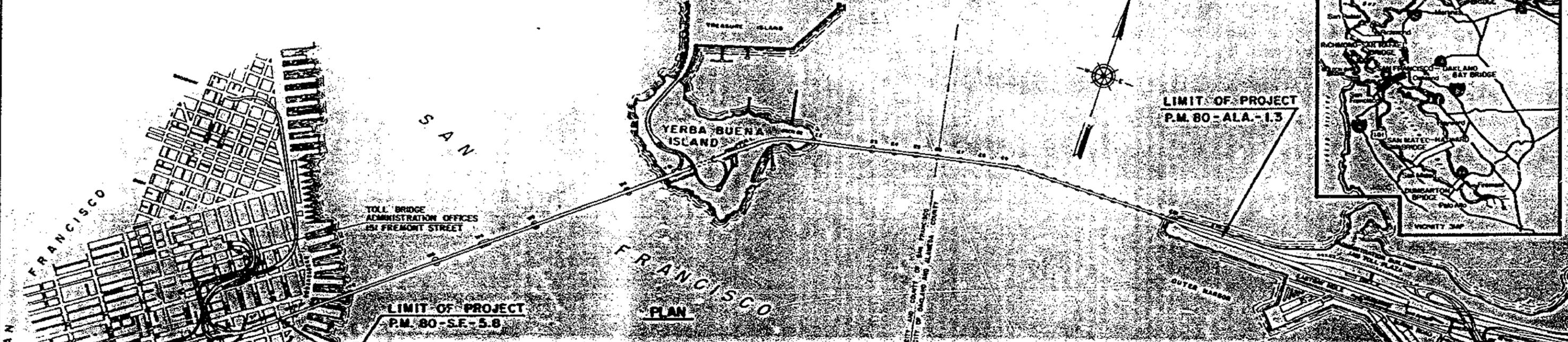
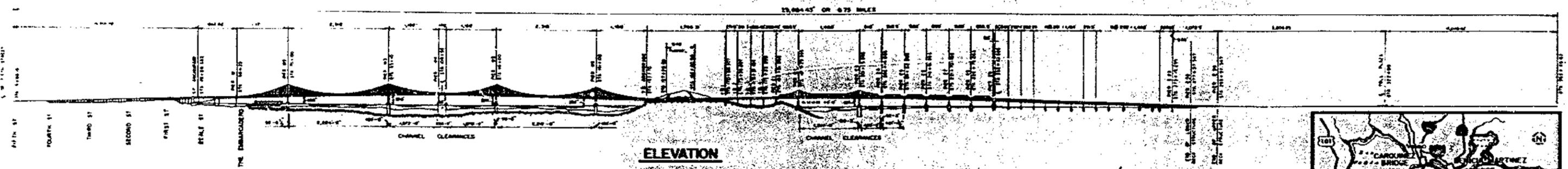
[13. Restrainer -Type III](#)

[14. Restrainer -Type IV & Tiedown Type A](#)

[15. Restrainer -Type V](#)

[16. Tiedown Type B](#)

[17. Rocker Bearing Repair-W1](#)



LIMIT OF PROJECT
P.M. 80-SF-5.8

LIMIT OF PROJECT
P.M. 80-ALA-1.3

INDEX TO PLANS

SHEET NUMBER	TITLE	SHEET NUMBER	TITLE
1	PROJECT PLAN AND ELEVATION	16	RESTRAINER DETAILS - TYPE I & TYPE II
2	GENERAL PLAN - E1 TO E11	17	RESTRAINER - TYPE III
3	GENERAL PLAN - E12 TO E20	18	RESTRAINER DETAILS - TYPE III
4	RESTRAINER LOCATION PLAN - Y11 TO 4	19	RESTRAINER - TYPE III
5	RESTRAINER LOCATION PLAN - E17 TO E22	20	RESTRAINER - TYPE IX & TIEDOWN - TYPE A
6	RESTRAINER LOCATION PLAN - E23 TO E28 (U.S.)	21	RESTRAINER - TYPE I
7	RESTRAINER LOCATION PLAN - E23 TO E33 (U.S.)	22	TIEDOWN - TYPE B
8	RESTRAINER LOCATION PLAN - E33 TO E39	23	ROCKER BEARING REPAIR - VI
9	RESTRAINER - TYPE I		

GENERAL NOTES

1. MVD = El. +9.00 at S.F.O.B.S.
USC & GS Mean Sea Level datum of 1929 = El. +3.10
MLLW = El. 0.00
2. Dimensions shown for existing members are taken from construction drawings. The Contractor shall field verify and adjust all dimensions to fit existing conditions since variations are to be anticipated. (Refer to Article 2.23 of the SPECIAL PROVISIONS)
3. Unless designated by the word "existing", all work shown shall be performed under this contract.
4. All bolted joints shall be friction type connections made with ASTM A325 high strength bolts with nuts and washers. Beveled washers shall be provided where required.

AS BUILT PLANS
Contract No. 04-64158
Date Completed _____
Document No. _____

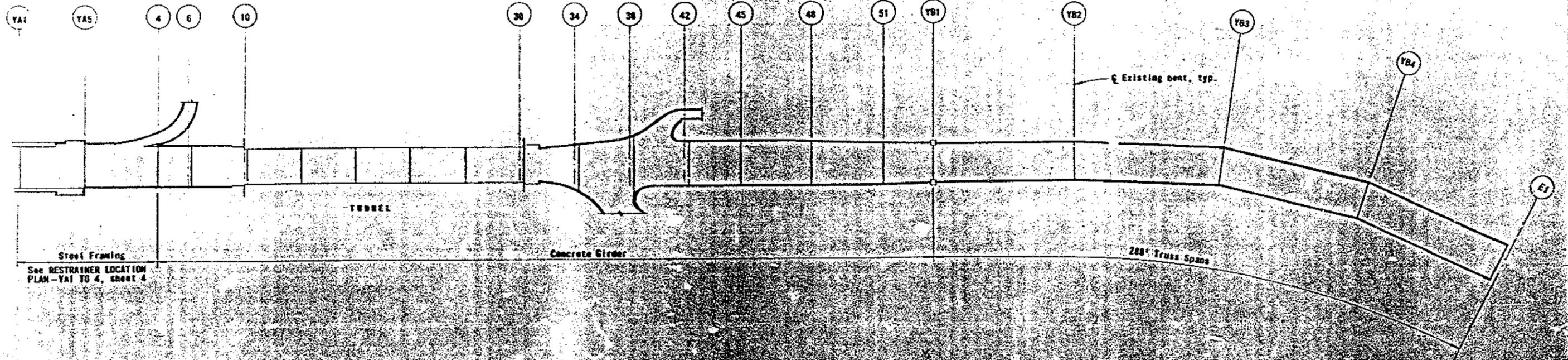
STATE OF CALIFORNIA - BUSINESS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION

NOVEMBER 12, 1974

SAN FRANCISCO - OAKLAND BAY BRIDGE
EARTHQUAKE RESTRAINERS

PROJECT PLAN AND ELEVATION

W1



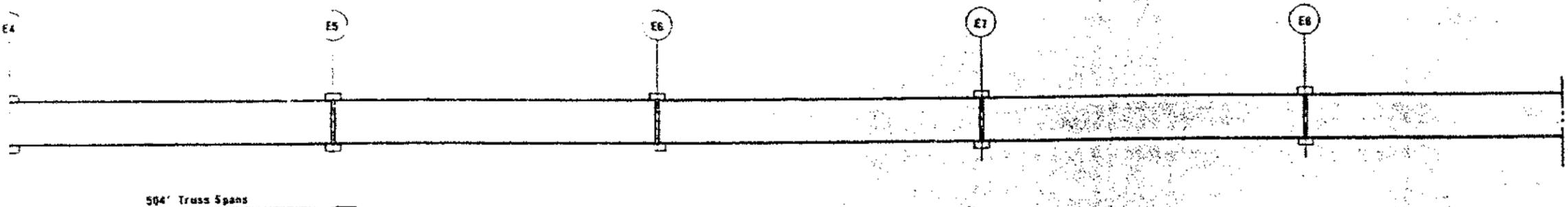
See RESTRAINER LOCATION PLAN - YAI TO 4, sheet 4

AS BUILT PLANS
Contract No. 24-64158
Date Completed _____
Document No. _____

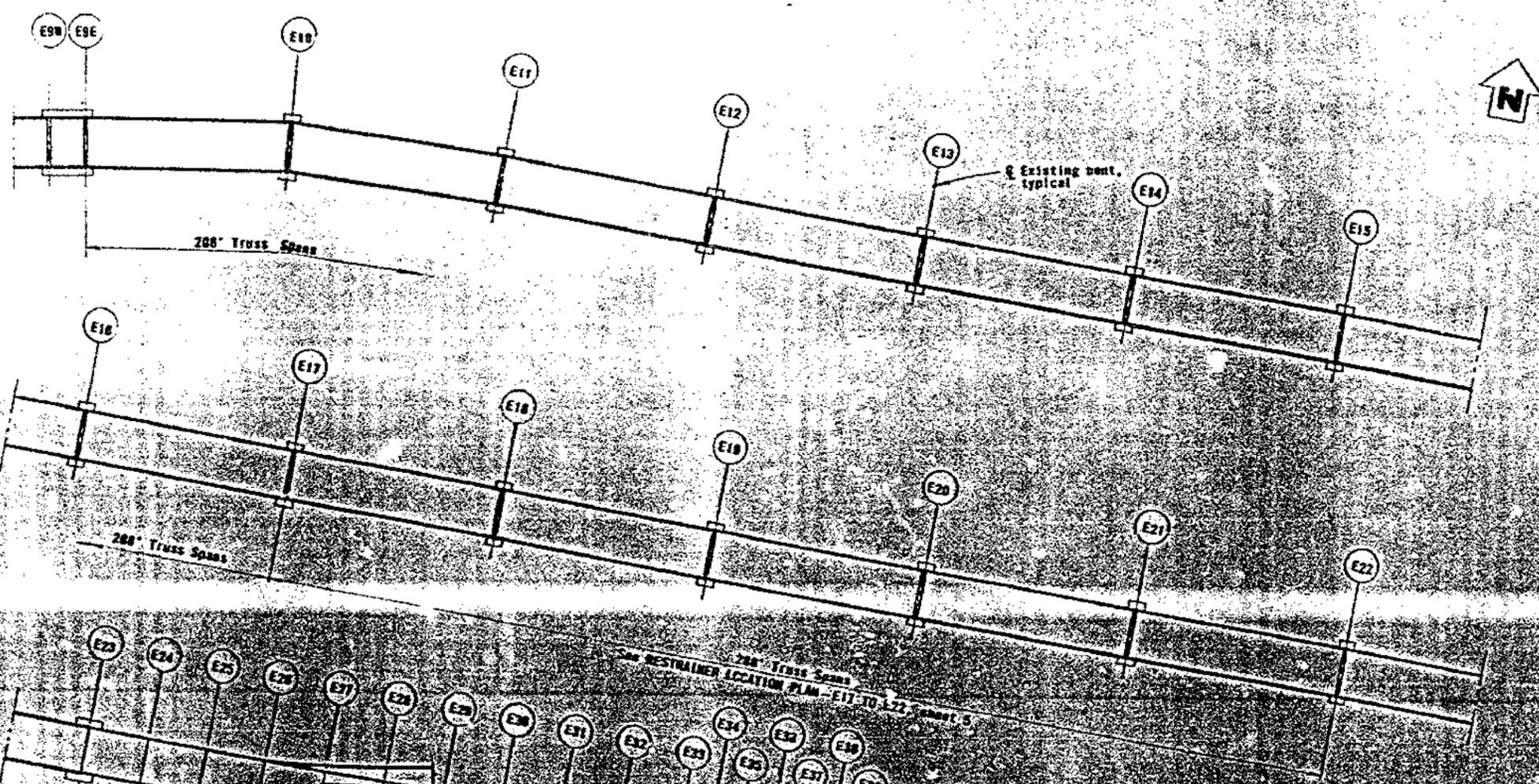


STATE OF CALIFORNIA - HIGHWAYS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
DESIGNED BY: <i>[Signature]</i>	CHECKED BY: <i>[Signature]</i>	EARTHQUAKE RESTRAINERS	
IN CHARGE OF DRAWING: <i>[Signature]</i>	APPROVED: <i>[Signature]</i>	GENERAL PLAN - W1 TO E1	
DATE: _____	NOVEMBER 12, 1974	SCALE: 1" = 100'	PROJECT: C-6, 100-20

AS BUILT	As built without revision	BY: <i>[Signature]</i>	DATE: _____
----------	---------------------------	------------------------	-------------

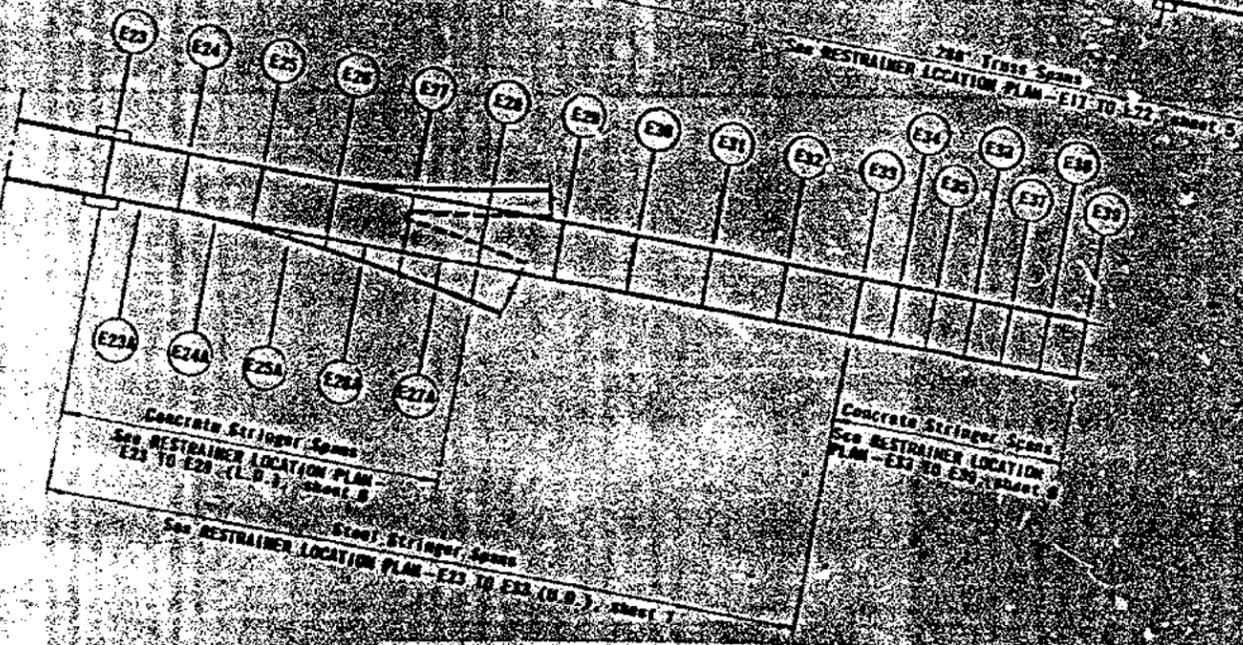


504' Truss Spans



288' Truss Spans

Existing bent, typical



See RESTRAINER LOCATION PLAN - E17 TO E22 - Sheet 5

See RESTRAINER LOCATION PLAN - E23 TO E28 (U.S.) - Sheet 6

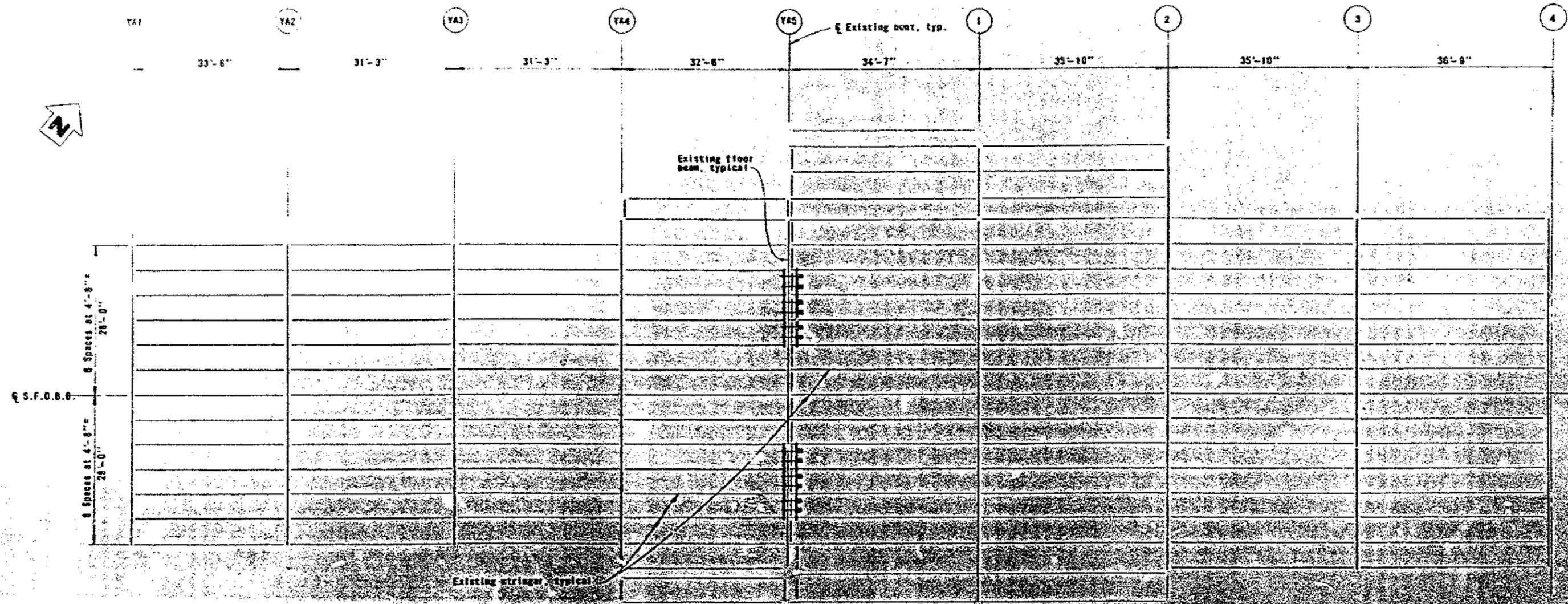
See RESTRAINER LOCATION PLAN - E29 TO E32 (U.S.) - Sheet 7

See RESTRAINER LOCATION PLAN - E33 TO E39 - Sheet 8



AS BUILT PLANS

STATE OF CALIFORNIA - HIGHWAY AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE EARTHQUAKE RESTRAINERS	
PROJECT: <i>San Francisco-Oakland Bay Bridge</i> DRAWING NO.: <i>100-1000-1000-1000</i> DATE: <i>11/12/54</i>	APPROVED: <i>[Signature]</i> NOVEMBER 12, 1954	GENERAL PLAN - E4 TO E39	
SCALE: 1" = 300' SHEET NO. 3 TOTAL SHEETS: 10	DRAWING NO. <i>100-1000-1000-1000</i> SHEET NO. 3 TOTAL SHEETS: 10		



PLAN
(Upper Deck Steel Framing)

LEGEND



ONE RESTRAINER - TYPE 1

NOTES

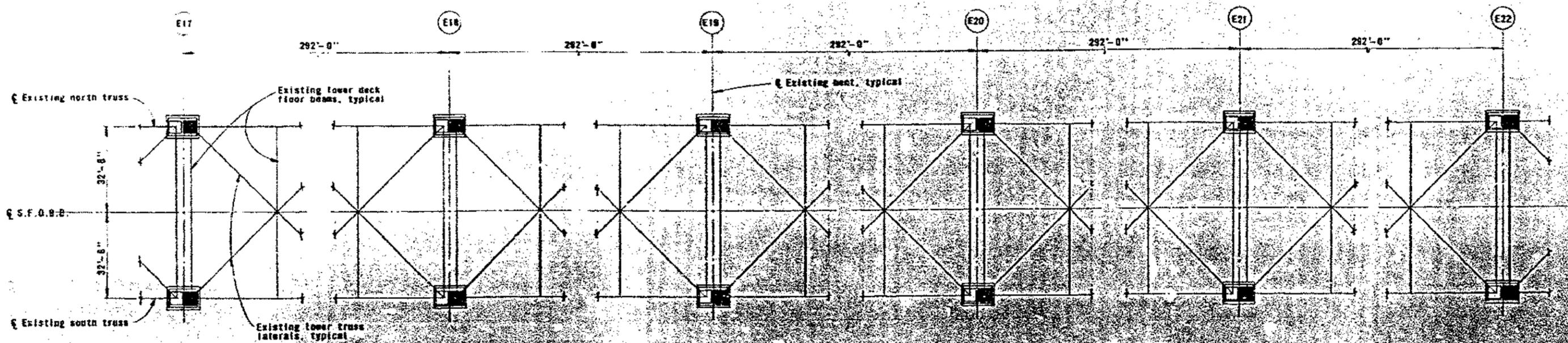
1. For details of RESTRAINER - TYPE 1, see sheets 3 and 10.

SCALE IN INCHES OR ORIGINAL

AS BUILT PLANS
Contract No. 24-64156
Date Completed _____
Document No. _____

AS BUILT WITHOUT REVISION

STATE OF CALIFORNIA - BUSINESS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
DESIGNED BY: <i>[Signature]</i>	CHECKED BY: <i>[Signature]</i>	EARTHQUAKE RESTRAINERS	
IN CHARGE OF DESIGN: <i>[Signature]</i>	APPROVED: <i>[Signature]</i>	RESTRAINER LOCATION PLAN - Y41 TO 4	
DATE: NOVEMBER 22, 1974	SCALE: AS SHOWN	DRAWING NO. 24-64156-10	



PLAN
(Taken at top of existing lower truss chord)

LEGEND

■ See RESTRAINER-TYPE II

NOTES

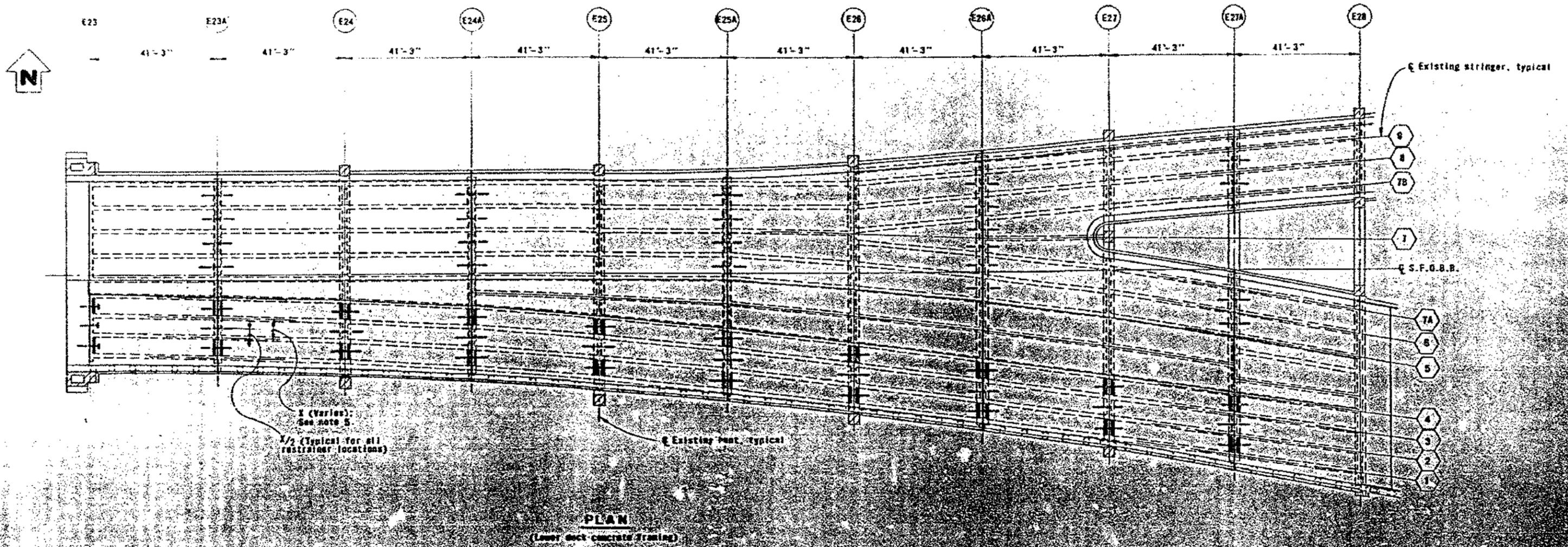
1. For data (13) on RESTRAINER-TYPE II, see sheets 11 and 12.

AS BUILT PLANS
Contract No. 24-6415B
Date Completed _____
Document No. _____



STATE OF CALIFORNIA — HIGHWAYS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION Approved by: <i>[Signature]</i> Date: <i>[Date]</i> Checked by: <i>[Signature]</i> Date: <i>[Date]</i> IN CHARGE OF BRIDGE: <i>[Signature]</i>		APPROVED NOVEMBER 12, 1974 <i>[Signature]</i>	SAN FRANCISCO-OAKLAND BAY BRIDGE EARTHQUAKE RESTRAINERS RESTRAINER LOCATION PLAN - E17 TO E22
1/2" = 1'-0" 1/4" = 3'-0" 1/8" = 6'-0" 1/16" = 12'-0" SCALE IN FEET ON ORIGINAL	SHEET NO. 5 TOTAL SHEETS 5	DRAWING NO. 5488-52	

AS BUILT DATE: _____ BY: _____	AS BUILT DATE: _____ BY: _____
--------------------------------------	--------------------------------------



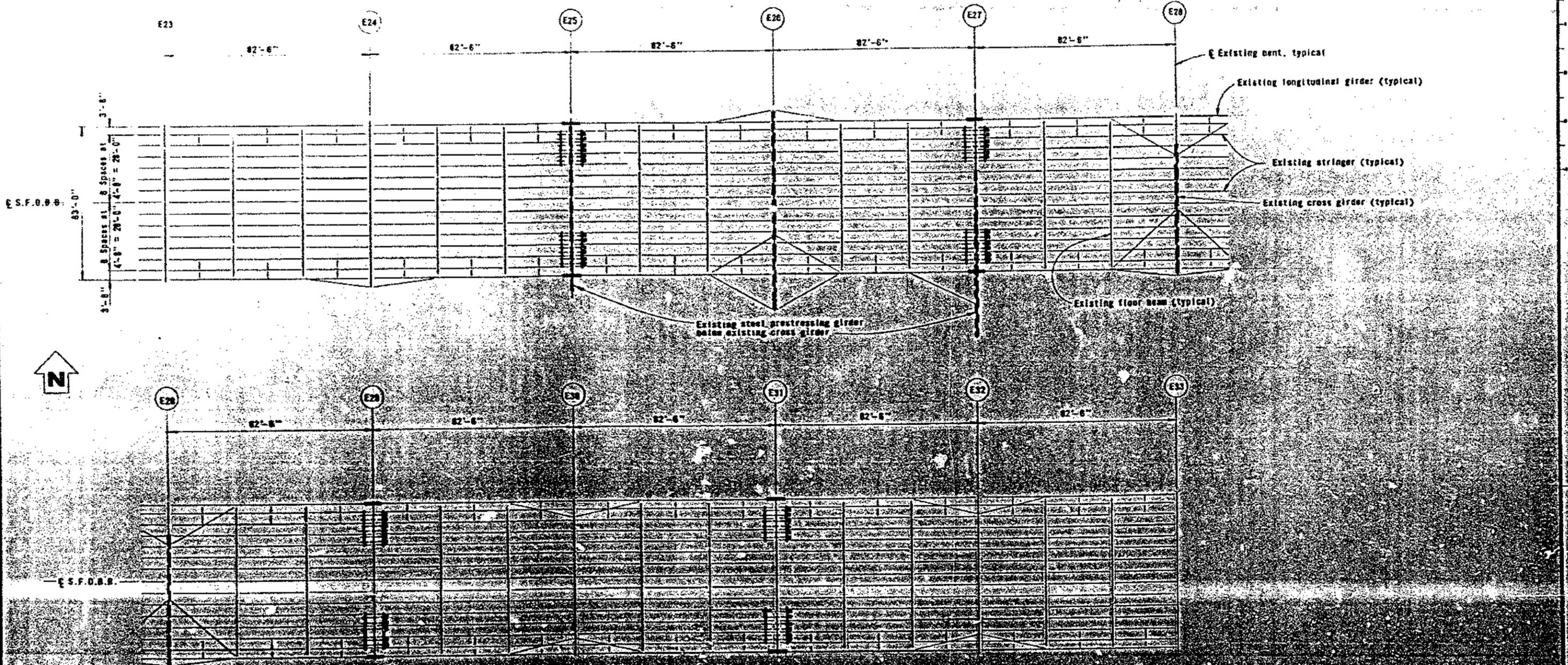
- NOTES**
1. For details of RESTRAINER - TYPE IV, see sheet 24
 2. For details of RESTRAINER - TYPE V, see sheet 25
 3. For details of TIEDOWN - TYPE A, see sheet 26
 4. For details of TIEDOWN - TYPE B, see sheet 27
 5. Dimension 'X' varies with the distance between the existing adjacent stringers.

- LEGEND**
- RESTRAINER - TYPE IV
 - RESTRAINER - TYPE V
 - TIEDOWN - TYPE A
 - TIEDOWN - TYPE B



AS BUILT PLANS
 Contract No. 24-64156
 Date Completed
 Document No.

STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE EARTHQUAKE RESTRAINERS	
DRAWN BY: <i>[Signature]</i> CHECKED BY: <i>[Signature]</i> IN CHARGE OF DESIGN: <i>[Signature]</i>	APPROVED: <i>[Signature]</i> DATE: NOVEMBER 27, 1974	RESTRAINER LOCATION PLAN - E23 TO E28 (L.D.)	
NAME: <i>[Blank]</i> DATE: <i>[Blank]</i>	NAME: <i>[Blank]</i> DATE: <i>[Blank]</i>	SHEET NO.: 6	TOTAL SHEETS: 10



NOTES

For details of RESTRAINER - TYPE II - SEE SHEETS 10 and 11.

PLAN
(Upper Deck Steel Framing)

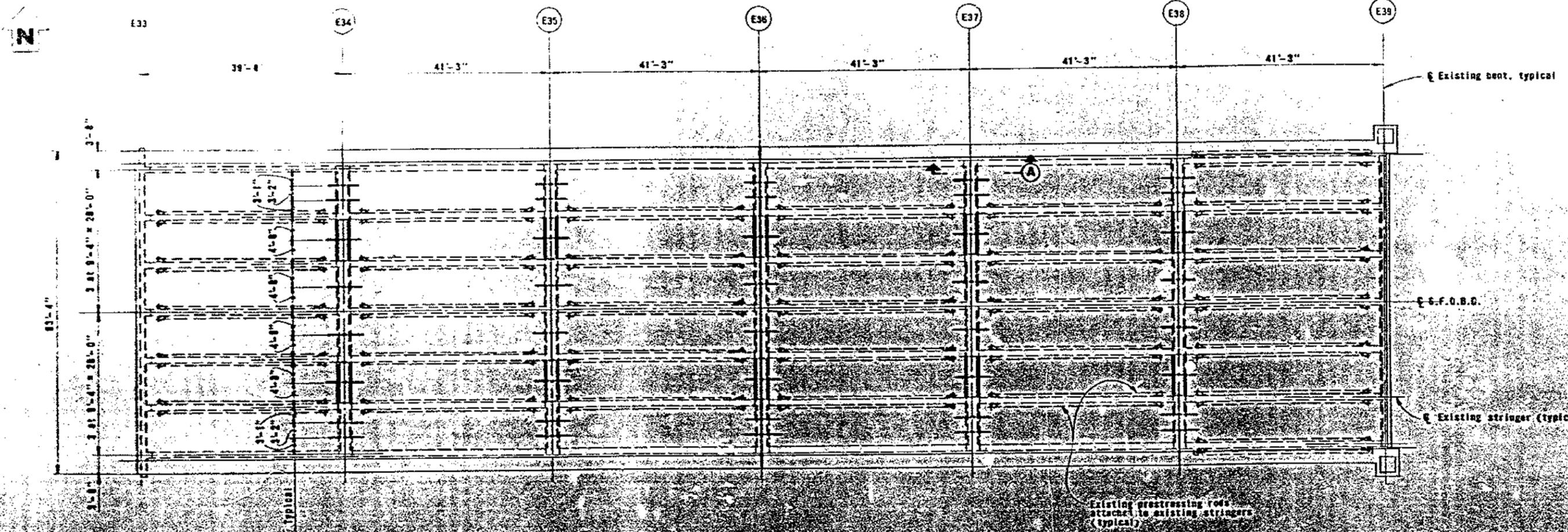
LEGEND



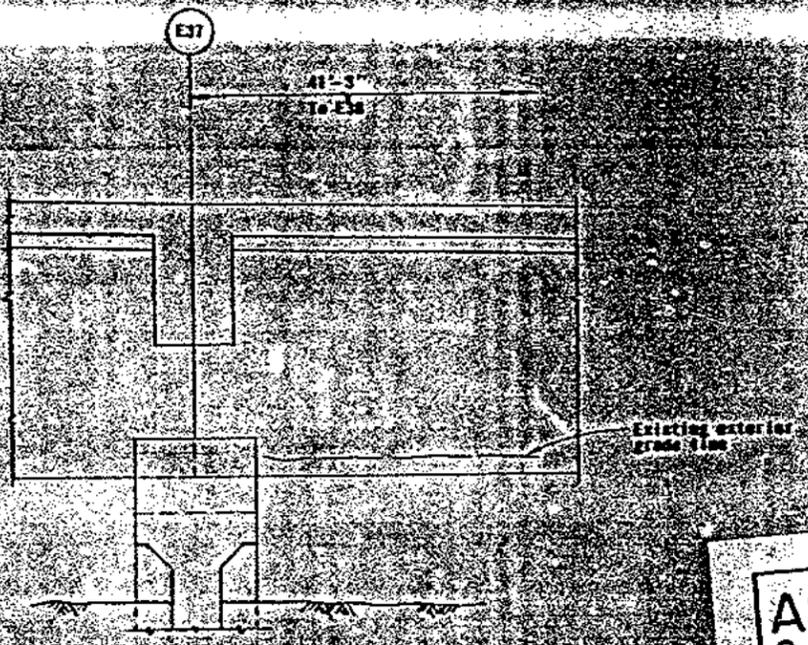
AS BUILT PLANS
Contract No. 24-6458
Date Completed
Document No.

DEPARTMENT OF CALIFORNIA HIGHWAYS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO OAKLAND BAY BRIDGE EARTHQUAKE RESTRAINERS	
APPROVED NOVEMBER 17, 1974 <i>[Signature]</i>		RESTRAINER LOCATION PLAN - E23 TO E33 (I.D.)	
DRAWN BY <i>[Signature]</i>	CHECKED BY <i>[Signature]</i>	DATE 11/17/74	SHEET NO. 1 OF 1

TITLE RESTRAINER LOCATION PLAN	DATE 11/17/74	SCALE AS SHOWN	SHEET NO. 1 OF 1
-----------------------------------	------------------	-------------------	---------------------



PLAN
(Concrete Framing)



SECTION, A-A
1/2" = 1'-0"

LEGEND

- TIEDOWN - TYPE B
- RESTRAINER - TYPE T

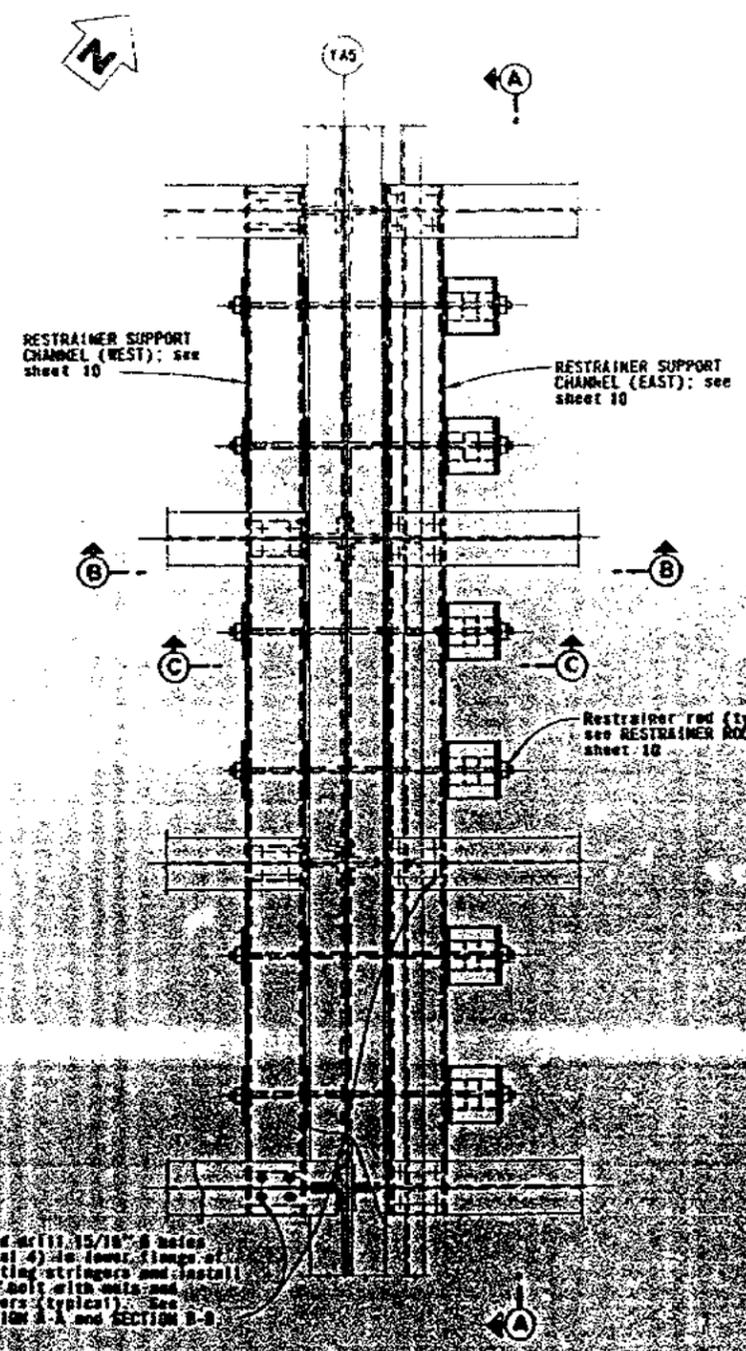
NOTES

1. For details of RESTRAINER - TYPE T, see sheet 15.
2. For details of TIEDOWN - TYPE B, see sheet 16.



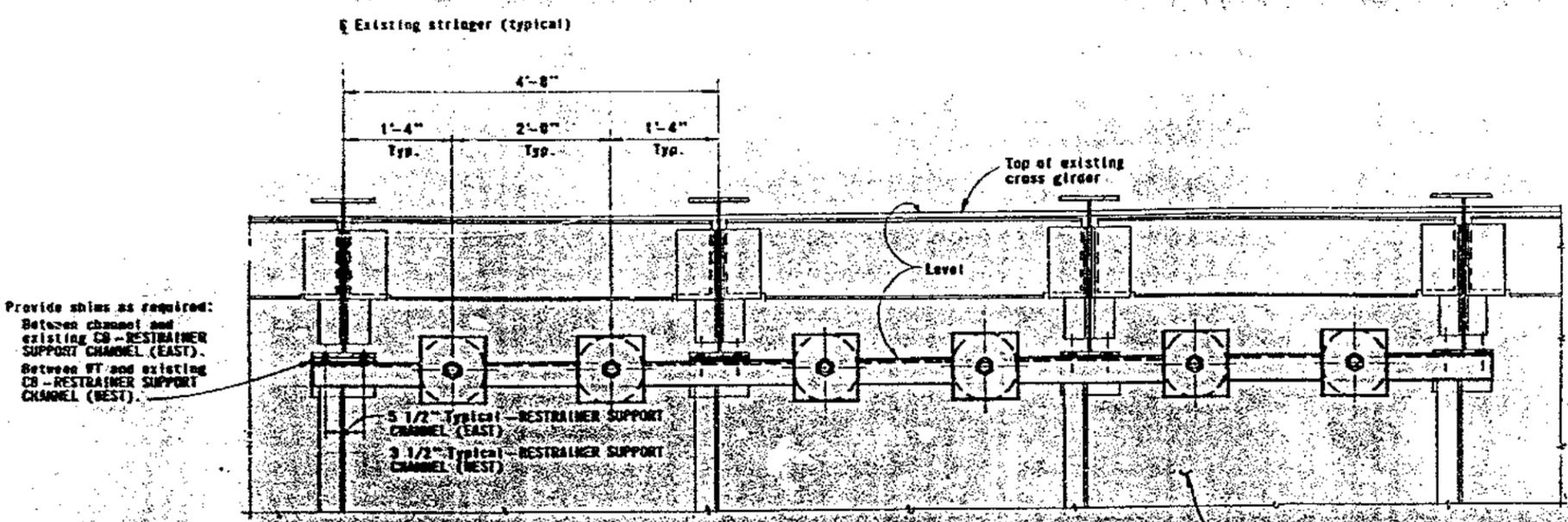
AS BUILT PLANS
Contract No. 04-6415B
Date Completed _____
Document No. _____

STATE OF CALIFORNIA - BUSINESS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
DESIGNED BY <i>W. J. ...</i>	CHECKED BY <i>...</i>	DATE NOVEMBER 12, 1974	EARTHQUAKE RESTRAINERS
IN CHARGE OF DESIGN <i>...</i>		RESTRAINER LOCATION PLAN - E33 TO E39	
APPROVED <i>...</i>		SCALE: 1/2" = 1'-0"	



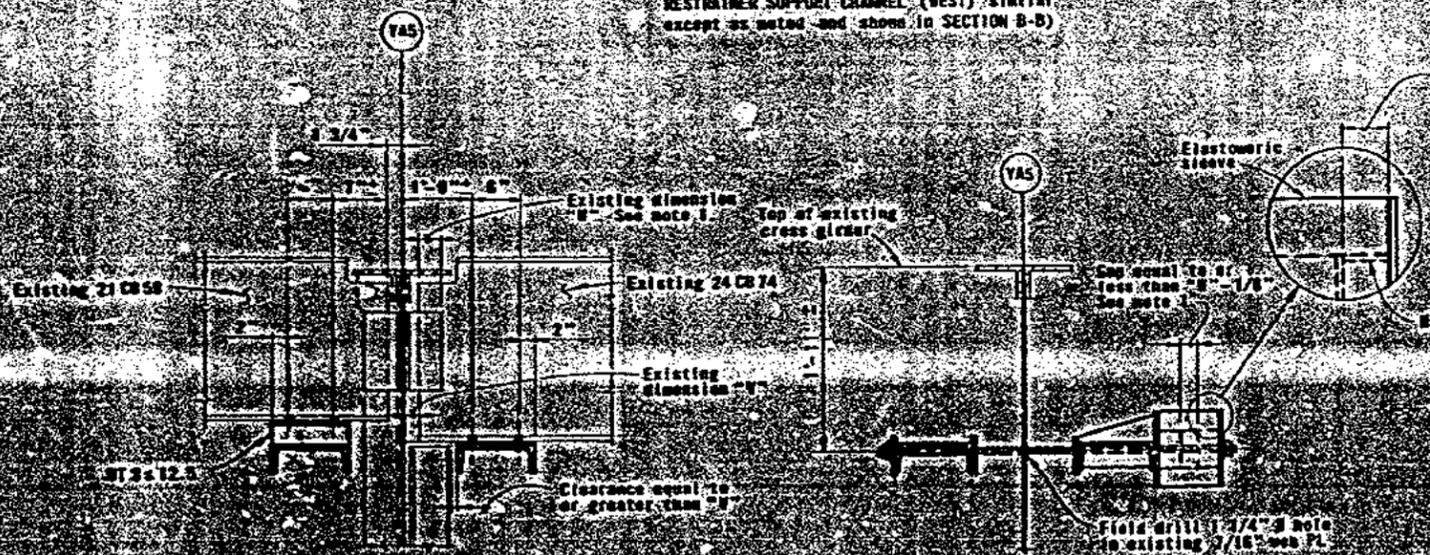
FRAMING PLAN DETAIL

(Taken north of bridge & existing roadway plan not shown)
1/4" = 1'-0"



SECTION A-A

(RESTRainer SUPPORT CHANNEL (EAST) shown - RESTRAINER SUPPORT CHANNEL (WEST) similar except as noted and shown in SECTION B-B)



SECTION B-B

SECTION C-C

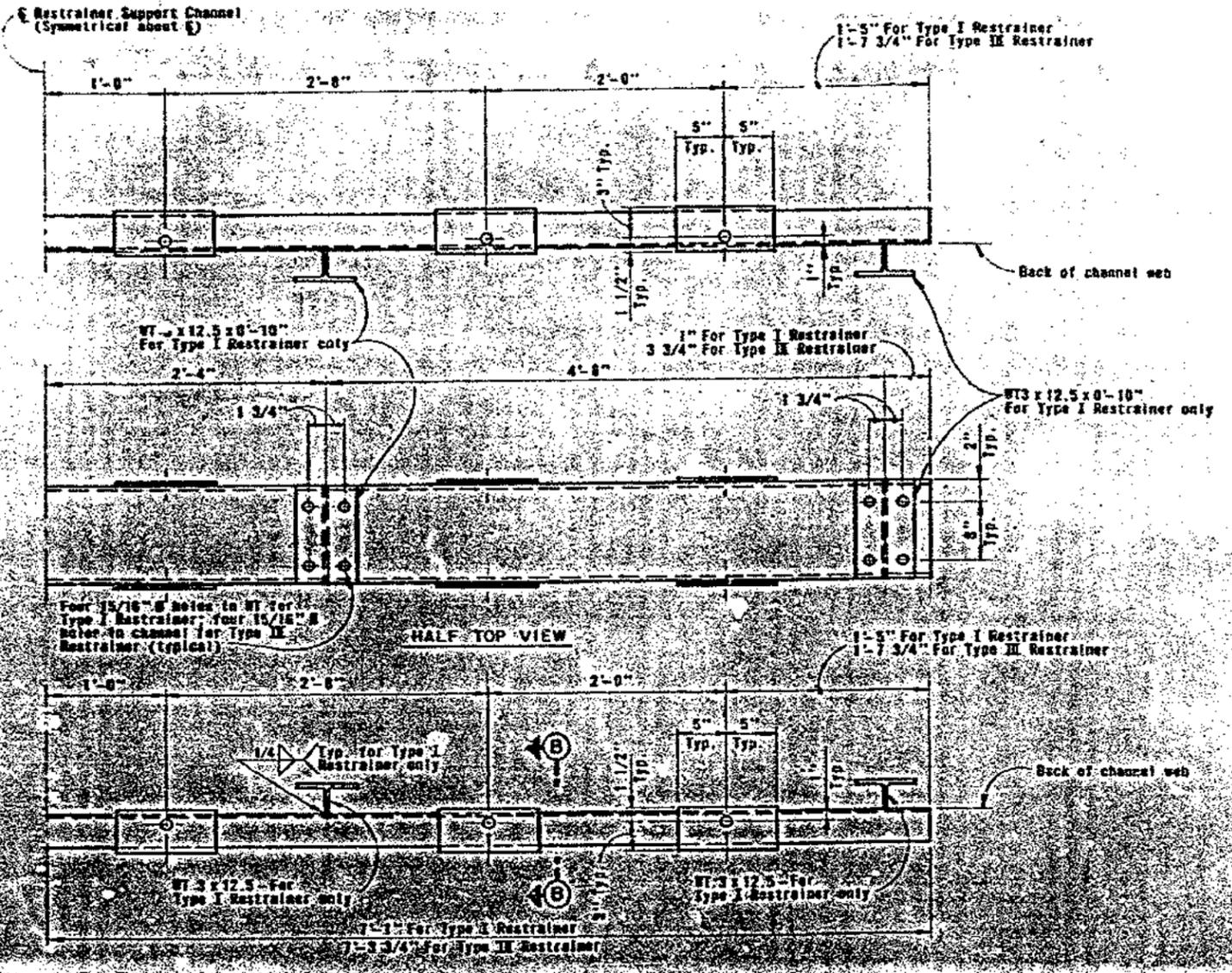
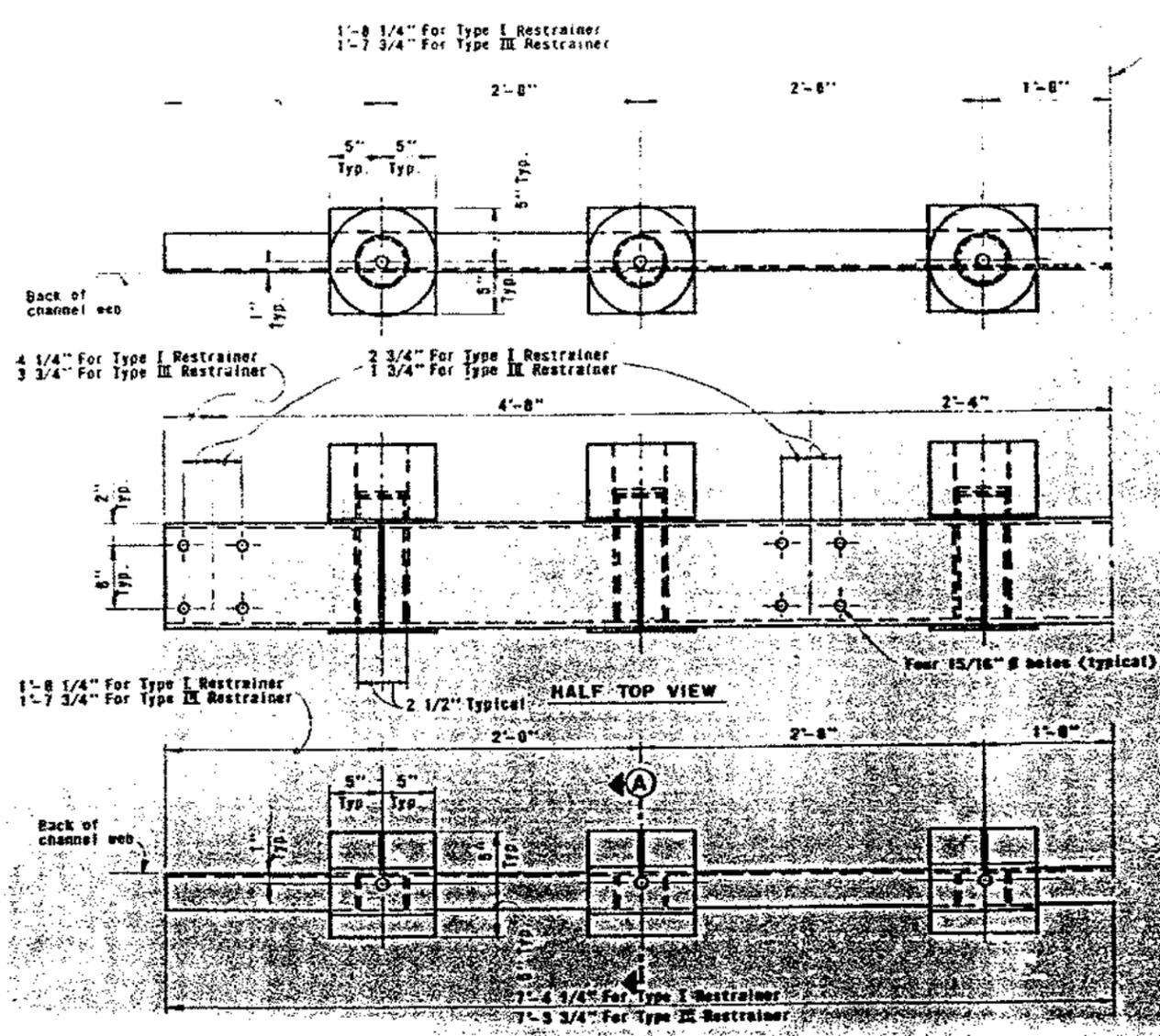
NOTES

1) After installation of restainer, existing dimension "U" shall be checked. When this dimension is less than 2 1/2" the restainer rod nut shall be tightened to reduce the gap in the elastomeric sleeve to 1/8" less than "U"

AS BUILT PLANS
Contract No. 04-64138
Date Completed
Document No.

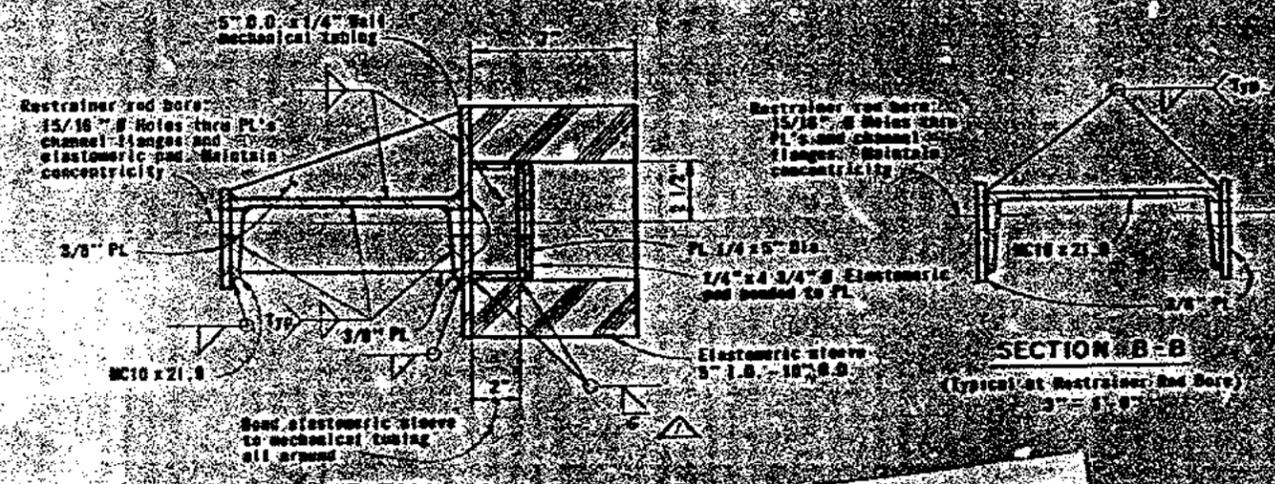
450	As built without revision	RL	ELC
DATE	DESCRIPTION	BY	CHK.

STATE OF CALIFORNIA — HIGHWAY AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION PROJECT NO. 04-64138 DRAWING NO. 04-64138-7 DATE: NOVEMBER 12, 1974 APPROVED: <i>[Signature]</i> SCALE: AS SHOWN ON ORIGINAL		SAN FRANCISCO-OAKLAND BAY BRIDGE EARTHQUAKE RESTRAINERS RESTRAINER TYPE I
--	--	---



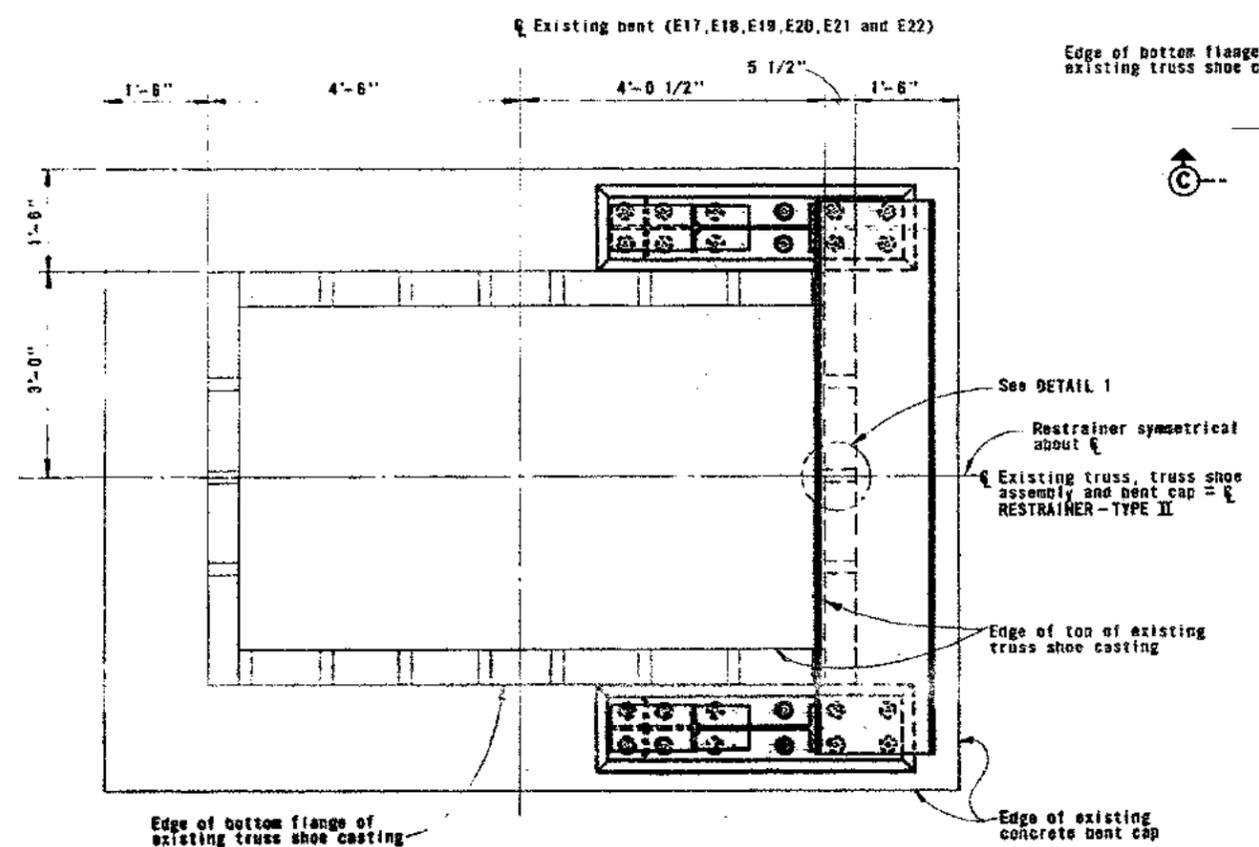
RESTRAINER SUPPORT CHANNEL (EAST)

RESTRAINER SUPPORT CHANNEL (WEST)

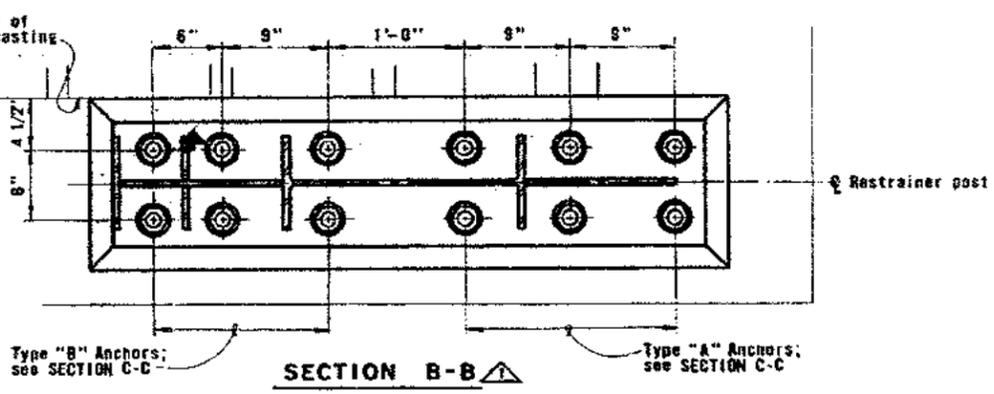


AS BUILT PLANS
No. 04-6456

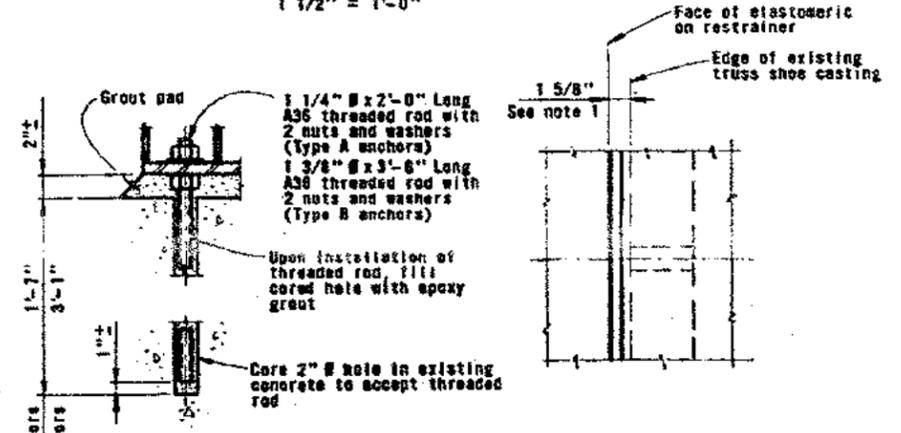
STATE OF CALIFORNIA - HIGHWAY AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION PROJECT NO. 04-6456 DRAWING NO. 10 DATE: NOVEMBER 22, 1974 APPROVED: [Signature] IN CHARGE OF DESIGN: [Signature]		SAN FRANCISCO-OAKLAND BAY BRIDGE EARTHQUAKE RESTRAINERS RESTRAINER DETAILS - TYPE I & TYPE III UNLESS NOTED SCALE: 1/2" = 1'-0" SHEET NO. 10 OF 10	
---	--	--	--



SECTION A-A
No Scale

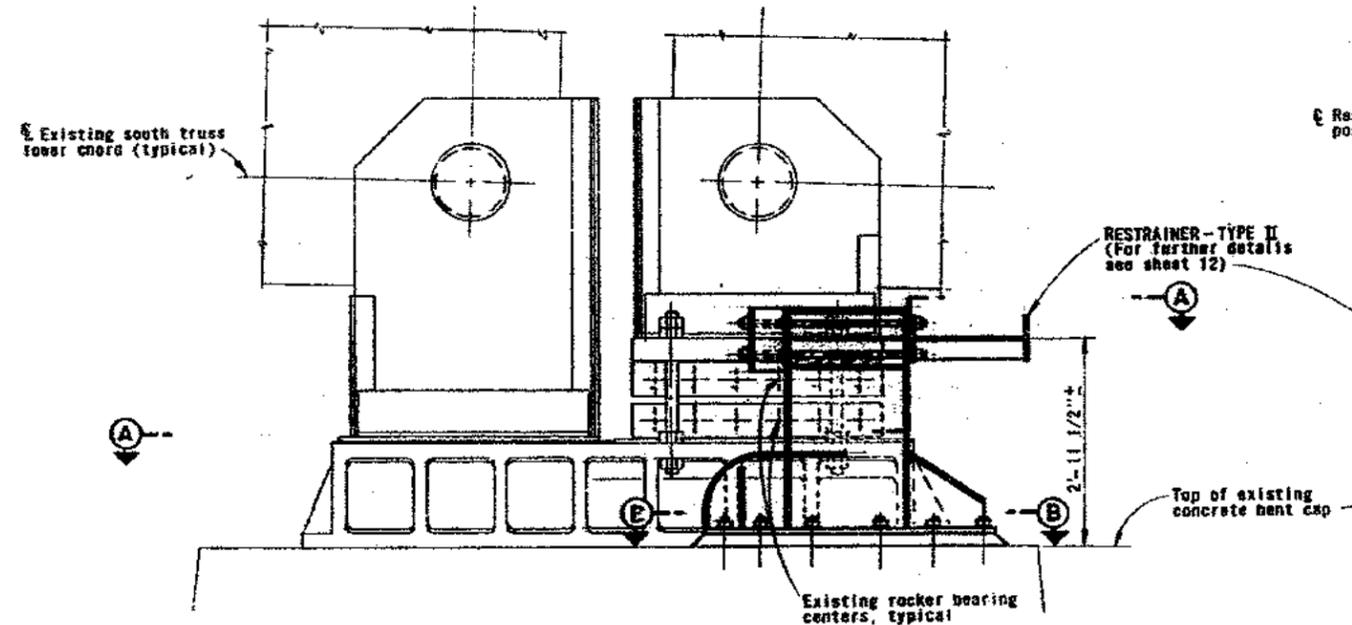


SECTION B-B
1 1/2" = 1'-0"

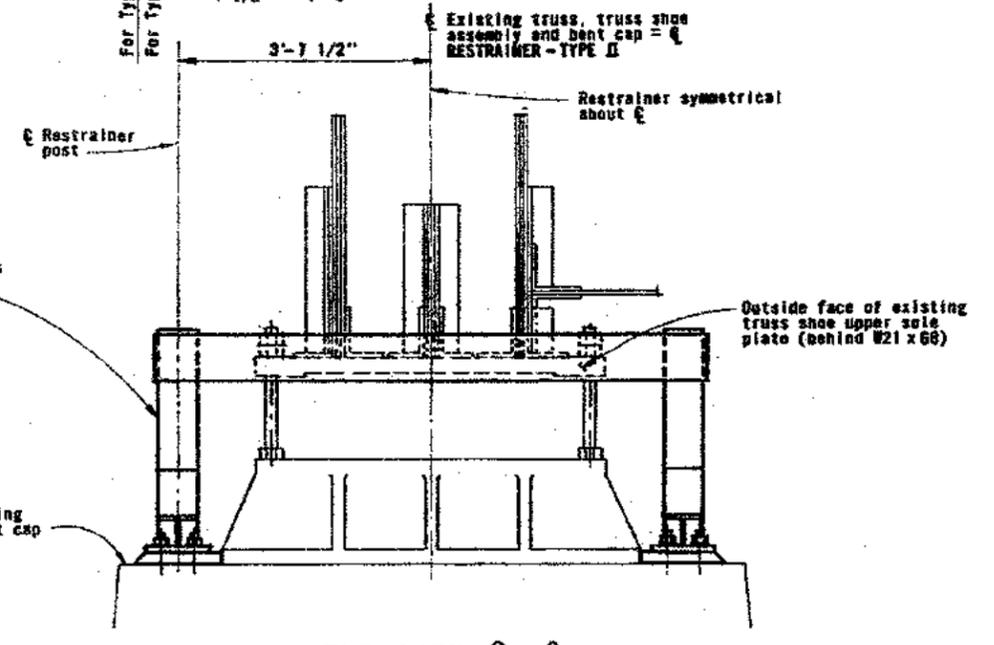


SECTION C-C
(Typical Anchor Detail)
1 1/2" = 1'-0"

DETAIL I
1 1/2" = 1'-0"



SIDE VIEW
(South side of existing bent cap shown - North side similar)
No Scale



END VIEW
No Scale

NOTES

1. Dimension shown was calculated using existing truss erection dimensions which assumed an ambient temperature of 62° F. The distance between the outside face of the existing truss shoe upper sole plate and the WF with elastomeric pad shall be 1 1/2" when the rocker bearing centers are aligned in a vertical position. This dimension varies from restrainer to restrainer, as the lower sole plate also shows a tendency to move.



AS BUILT PLANS
Contract No. 24-64/58
Completed

NO.	DATE	REVISION	BY	CHECKED
1	5/75	Restrainer - Type II Redesign	BL	FAR
2	4/76	As built with revision	BL	FAR

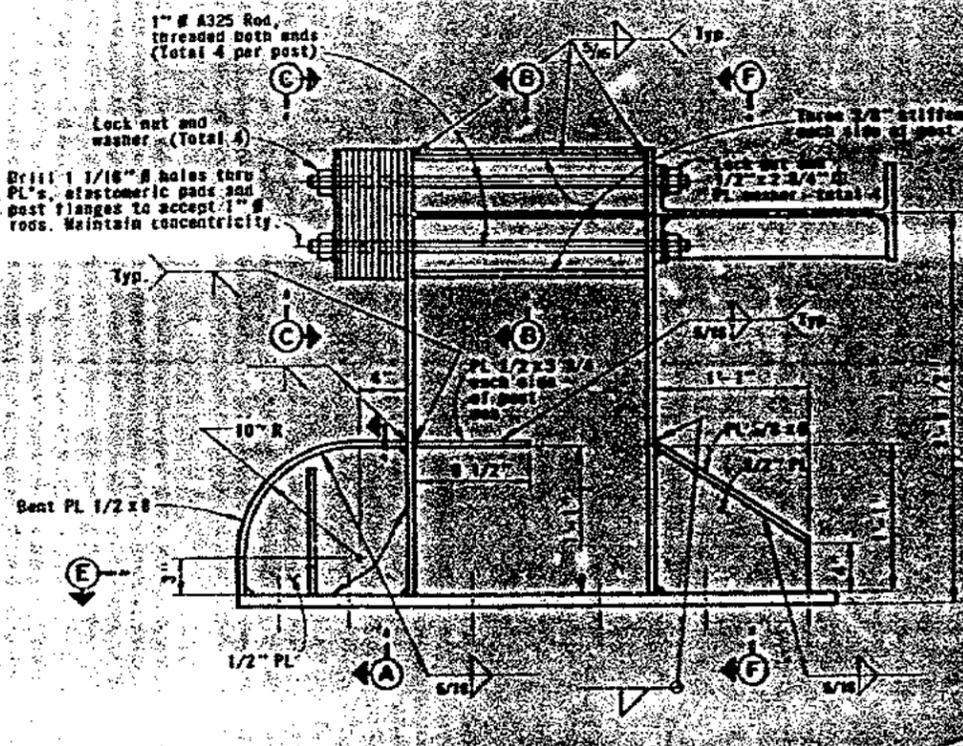
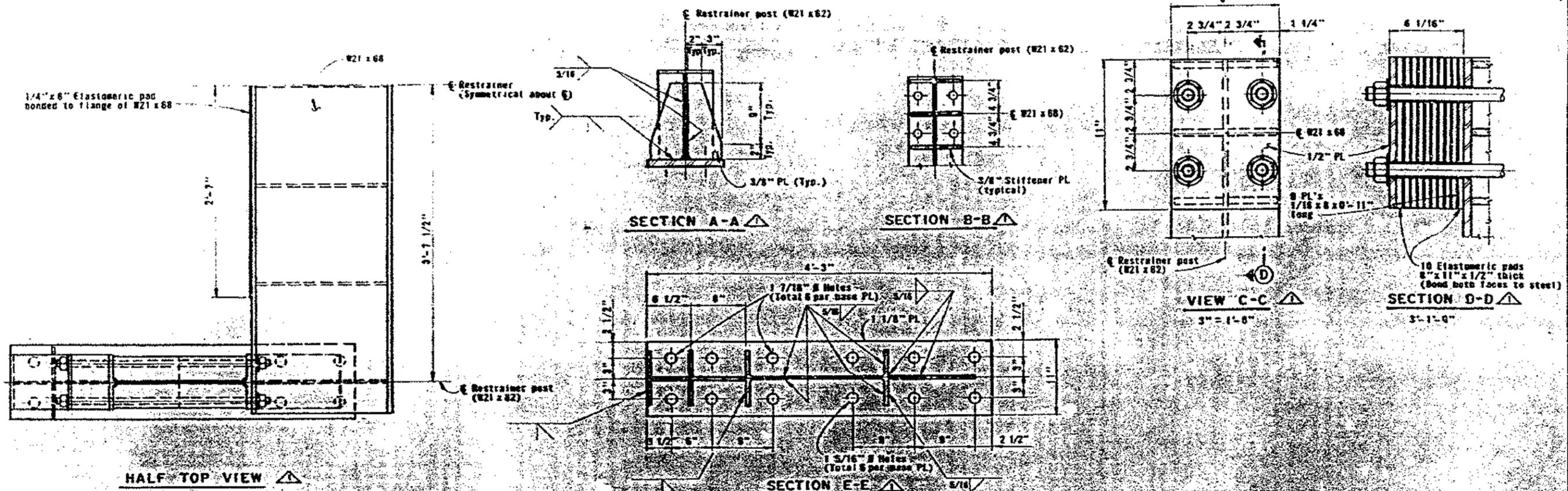
STATE OF CALIFORNIA — BUSINESS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION

APPROVED: MARCH 19, 1976

SAN FRANCISCO-OAKLAND BAY BRIDGE EARTHQUAKE RESTRAINERS

RESTRAINER - TYPE II

SCALE AS SHOWN SHEET NO. 11 DRAWING NO. C-64158-11B-1



AS BUILT PLANS
 Contract No. 04-64156
 Date Completed
 Document No.

1/2"	As built without revision	BL	CAF
3/16"	Restraint - Type I Redesign	DK	CAF
1/4"	Restraint - Type I Redesign	DK	CAF

STATE OF CALIFORNIA - HIGHWAYS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION

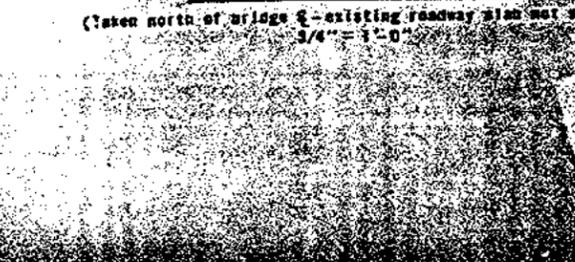
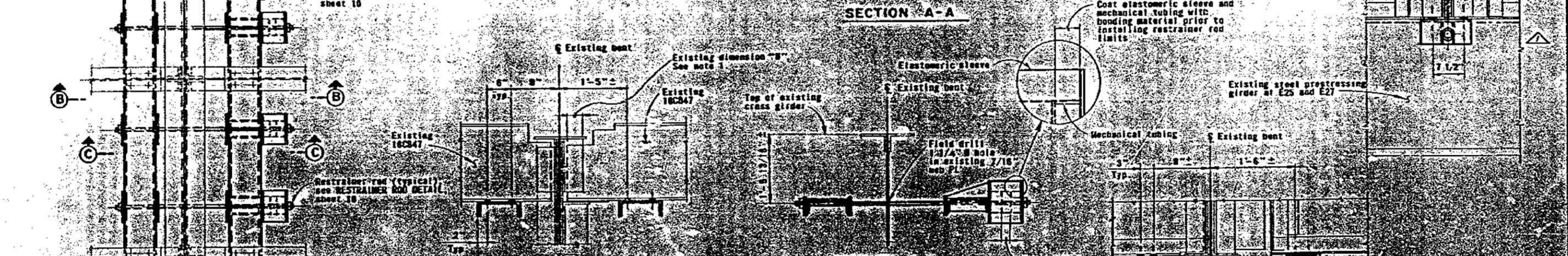
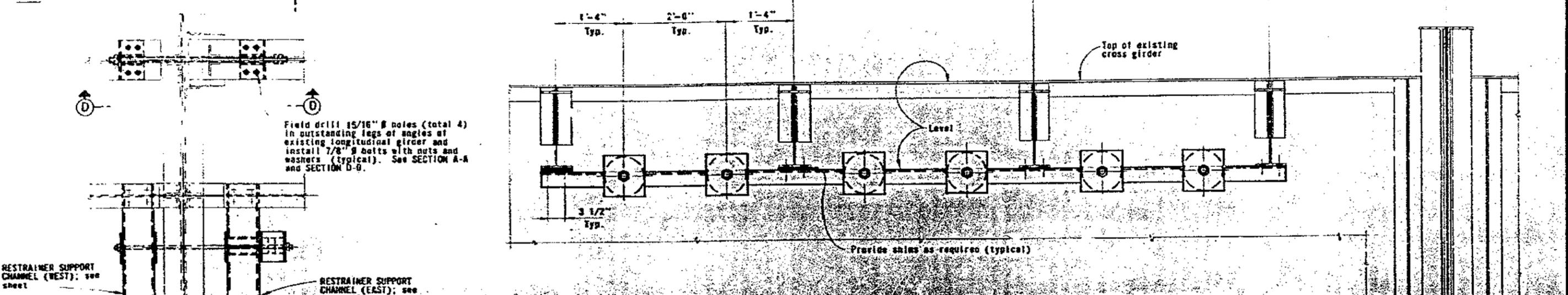
PROJECT: SAN FRANCISCO-OAKLAND BAY BRIDGE
 EARTHQUAKE RESTRAINERS
 RESTRAINER DETAILS - TYPE II

DATE: MARCH 19, 1975

SCALE: 1/2" = 1'-0"

APPROVED: [Signatures]

Existing bent (E25, E27, E29 & E31) Existing stringer (typical) Existing longitudinal girder



AS BUILT PLANS
 Contract No. 04-64156
 Date Completed _____
 Document No. _____

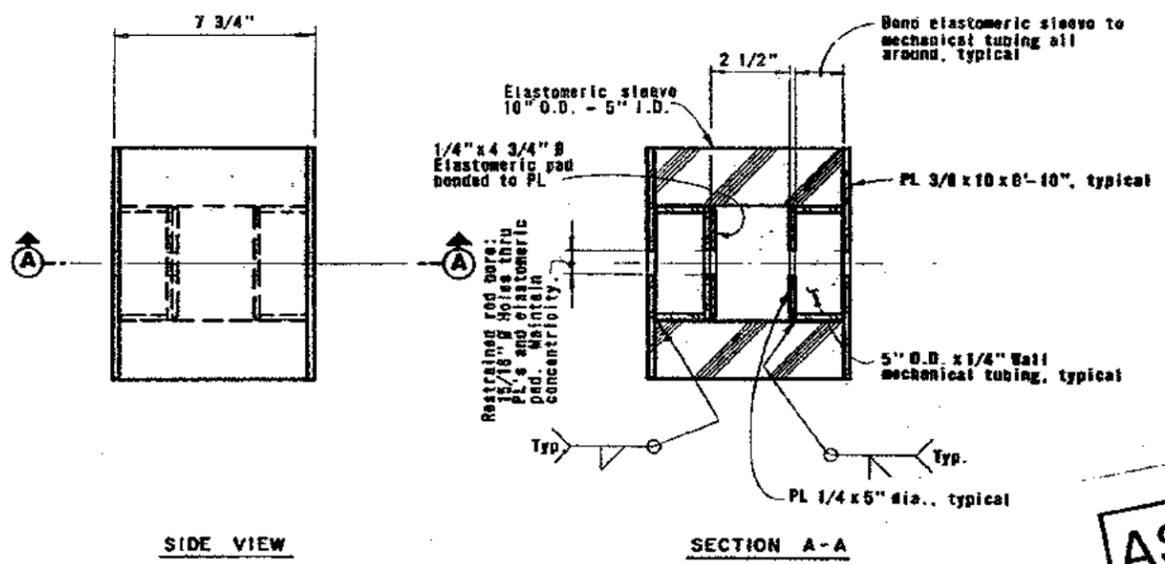
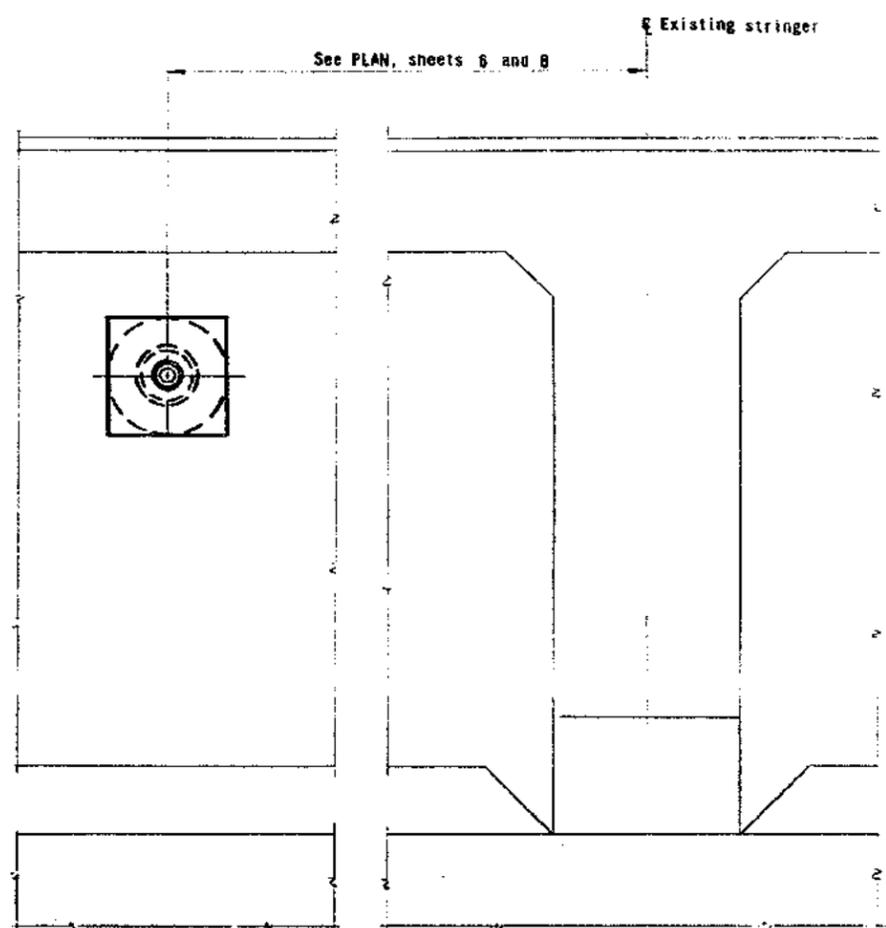
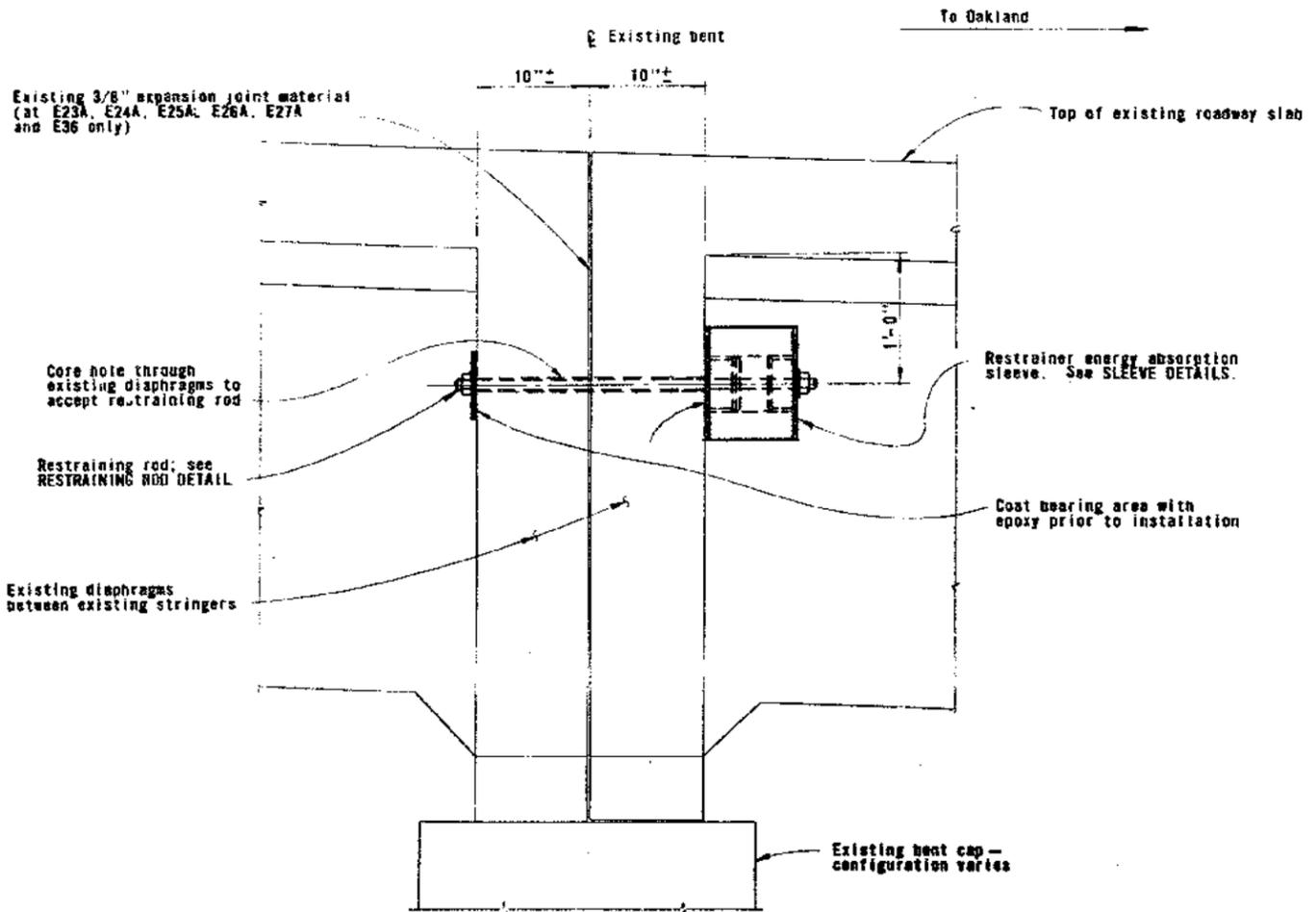


NOTES

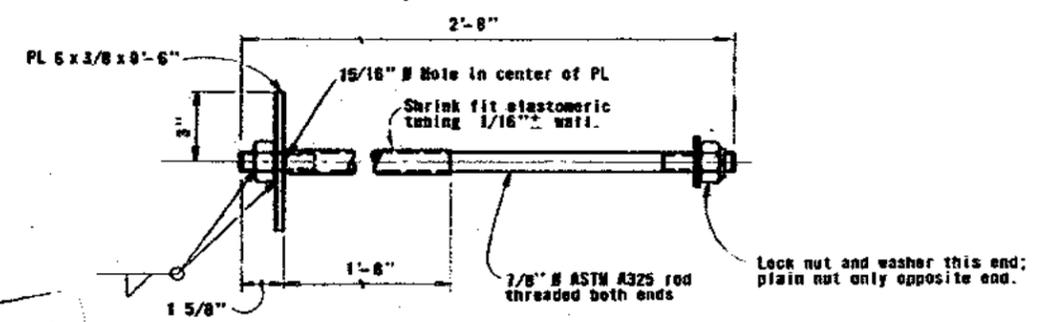
- See notes on sheet 8.
- See notes on sheet 9.
- See notes on sheet 10.

SCALE IN FEET OR INCHES

STATE OF CALIFORNIA - BUSINESS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
PROJECT: EARTHQUAKE RESTRAINERS		RESTRAINER TYPE III	
APPROVED: _____	DATE: NOVEMBER 12, 1974	DESIGNED BY: _____	CHECKED BY: _____



SLEEVE DETAILS
3" = 1'-0"



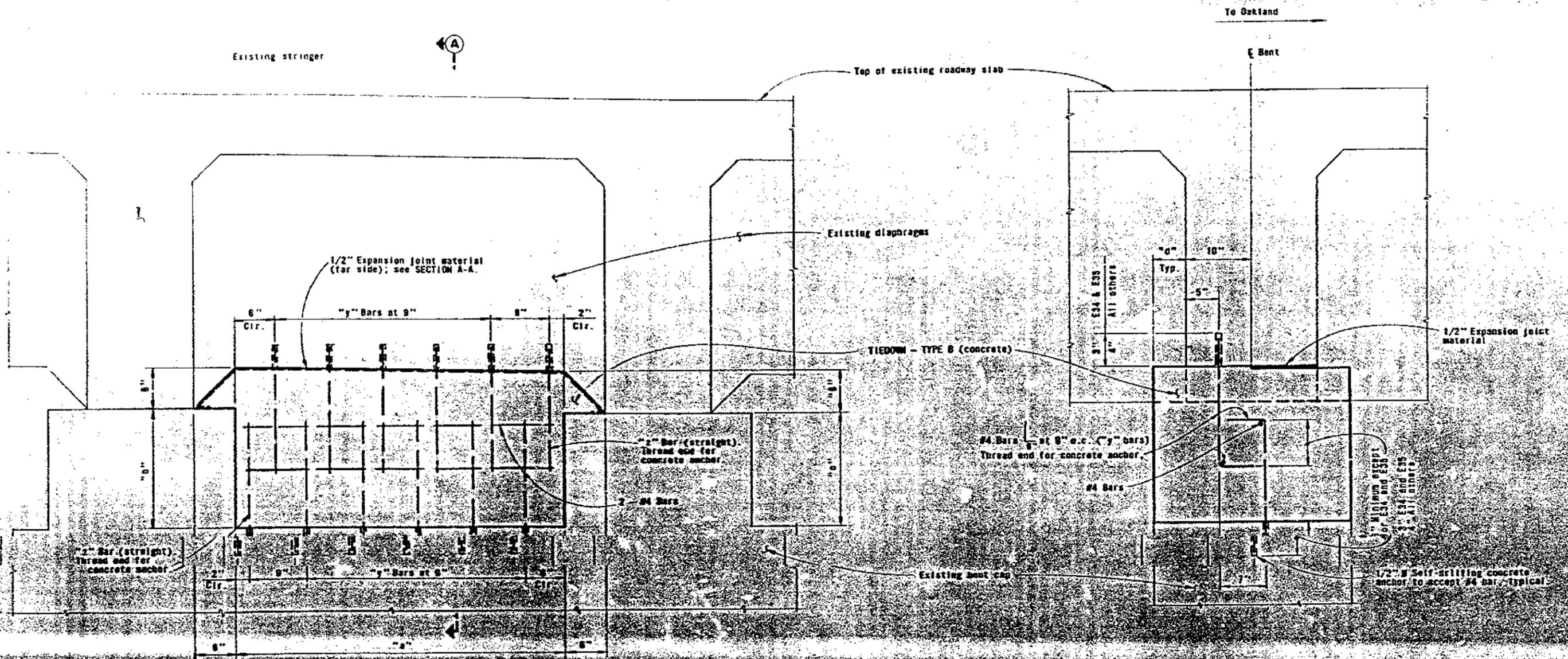
RESTRAINING ROD DETAILS
3" = 1'-0"



AS BUILT PLANS
Contract No. 04-6415B
Date Completed _____
Document No. _____

4-23	As built without revision	BL	F.A.R.
DATE	REVISION	BY	CHK.

STATE OF CALIFORNIA - BUSINESS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION		SAN FRANCISCO-OAKLAND BAY BRIDGE	
DESIGN BY: <i>W. G. G. G.</i>	CHECKED BY: <i>R. B. B.</i>	EARTHQUAKE RESTRAINERS	
PREPARED BY: <i>W. G. G. G.</i>	DATE: <i>11/12/74</i>	RESTRAINER - TYPE 3	
IN CHARGE OF DESIGN: <i>W. G. G. G.</i>	APPROVED NOVEMBER 12, 1974	DRAWING NO. C-6415B-15R	
<i>Robert R. Bairdwell</i>	<i>S. Larsen</i>	SCALE UNLESS NOTED: 1 1/2" = 1'-0"	SHEET NO. 15



PARTIAL BENT ELEVATION

SECTION A-A

TABLE OF DIMENSIONS (in feet)

BENT DIMENSION	E22A		E24		E24A		E25		E25A		E26		E26A		E27		E27A		E34		E35		E36		E37		E38		
	Between 1-2	Between 3-4	North	South																									
"a"	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
"b"	10.0	10.2	10.2	10.4	14.3	17.2	12.1	15.5	18.0	15.8	17.5	17.5	18.7	17.7	18.3	18.2	11.3	12.0	11.6	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
"c"	19.0	20.3	17.0	18.4	15.7	18.5	23.0	17.0	11.0	15.4	19.1	12.2	13.0	11.0	10.3	12.4	12.7	14.5	14.0	14.0	14.0	12.5	12.5	12.5	12.5	12.5	12.5	12.5	
"d"	4.0	4.0	11.0	11.0	4.0	4.0	11.0	11.0	4.0	4.0	11.0	11.0	13.0	13.0	11.0	11.0	13.0	13.0	5.0	5.0	5.0	5.0	4.0	4.0	5.0	5.0	5.0	5.0	

NOTE: The dimensions in this table are approximate only and do not take into consideration the skew angle between existing diaphragms and stringers which occurs at certain bents as shown on RESTRAINER LOCATION PLAN - E23 TO E28 (L.D.)

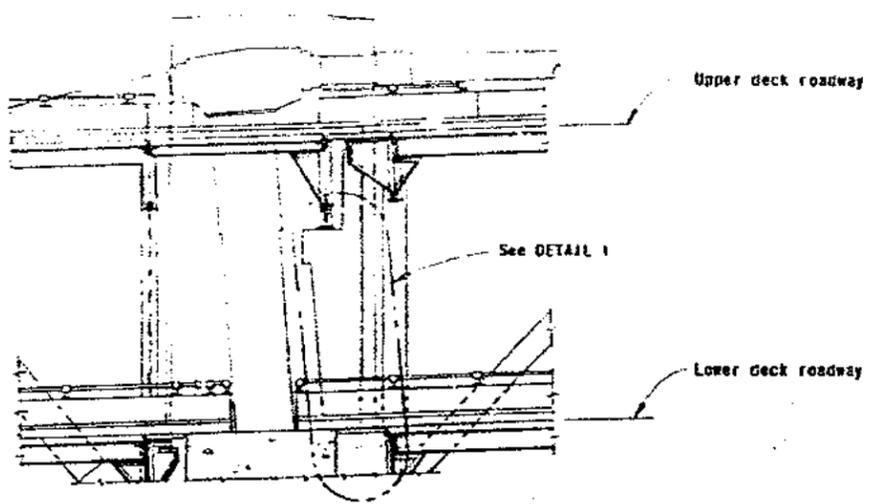
AS BUILT PLANS
 Contract No. 04-6415B
 Date Completed _____
 Document No. _____

STATE OF CALIFORNIA — HIGHWAYS AND TRANSPORTATION AGENCY — DEPARTMENT OF TRANSPORTATION

SAN FRANCISCO-OAKLAND BAY BRIDGE
EARTHQUAKE RESTRAINERS
TIEDOWN TYPE B

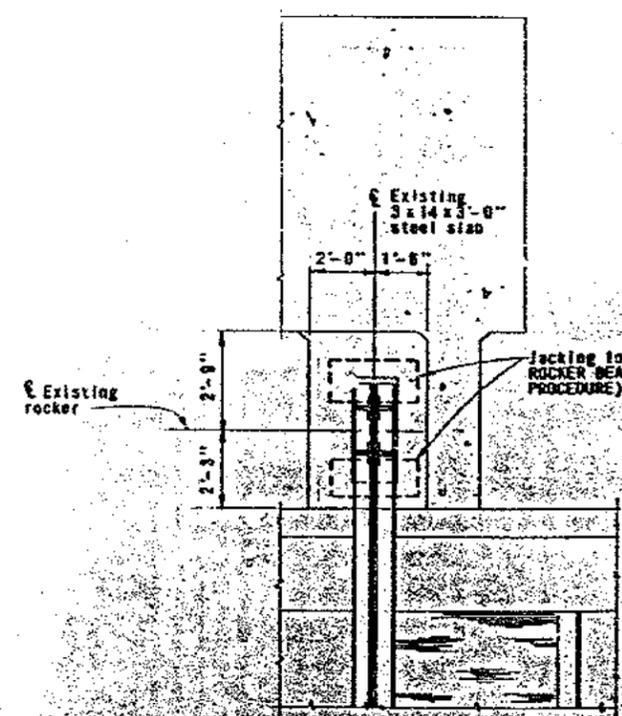
APPROVED NOVEMBER 12, 1974

16

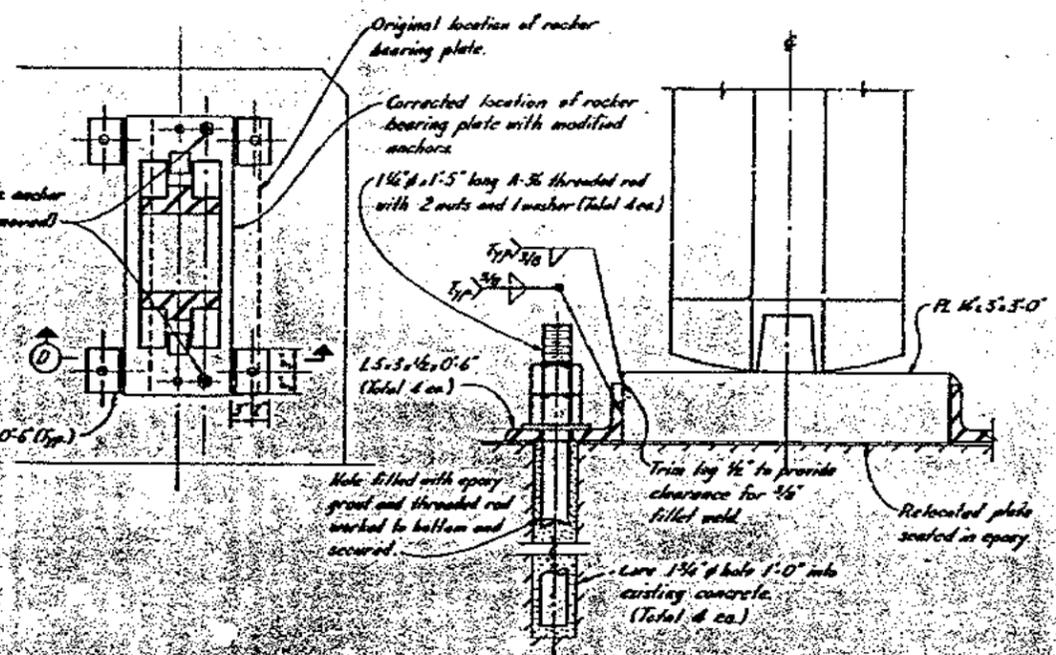


SECTION A-A

(North side looking North)
(South side opposite hand)
Sheet 2
No Scale



SECTION B-B

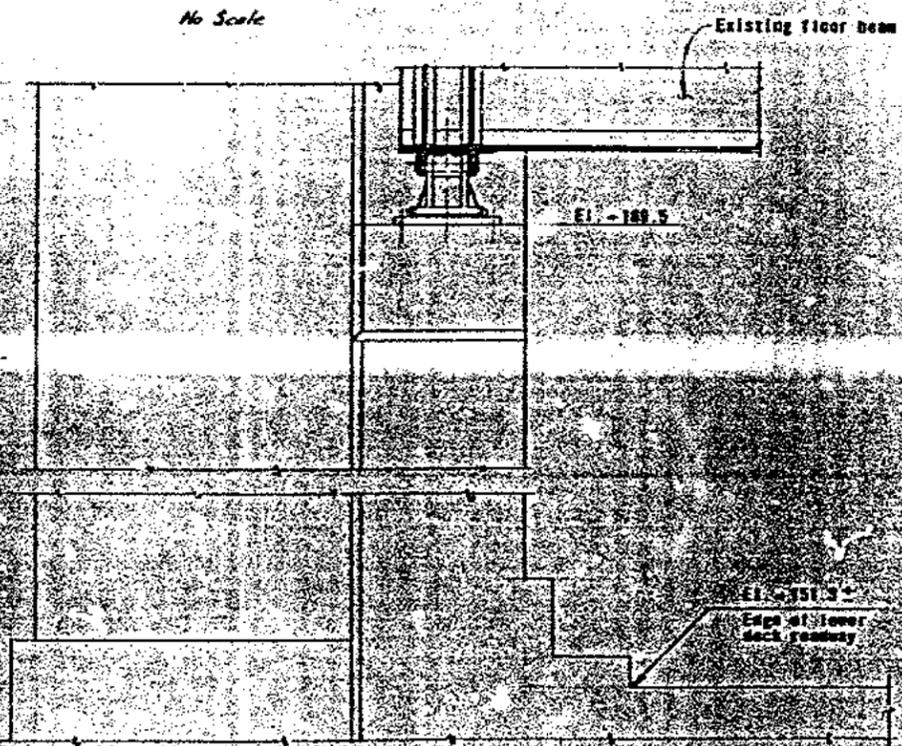


SECTION C-C

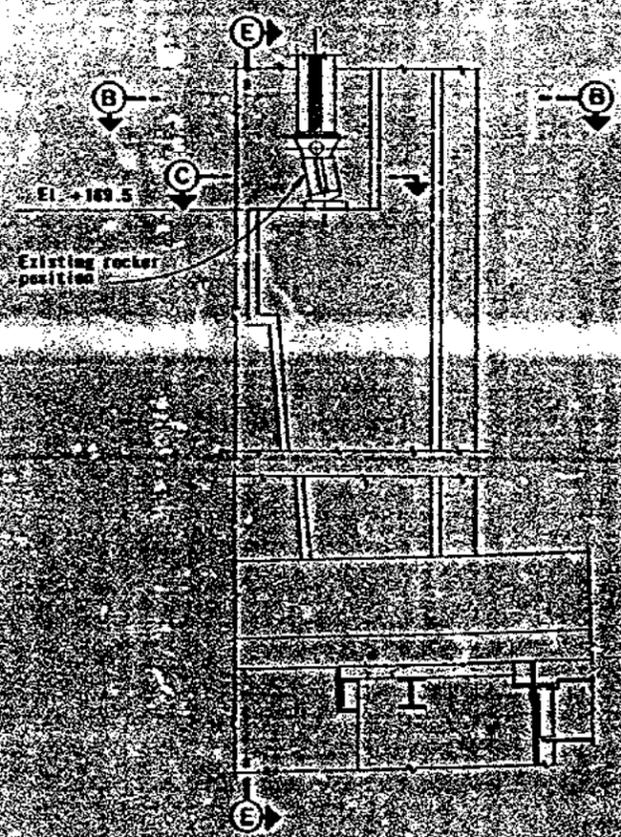
(See ROCKER BEARING REPAIR PROCEDURE)
1'-1-0"

SECTION D-D

(See ROCKER BEARING REPAIR PROCEDURE)
5'-1-0"



SECTION E-E



DETAIL 1

ROCKER BEARING REPAIR PROCEDURE

1. Core drill and install two new 1/4" dia anchor bolts in epoxy on west side of base plate.
2. Remove existing 1/4" dia anchor bolts.
3. Jack existing floor beam to relieve load and reposition existing rocker to align with center line of floor beam. Jacking devices used shall have a combined rating of 40 tons minimum.
4. Hold two new angles 1.5x3x1/2x0-6 to west side of existing base plate.
5. Core drill and install two new anchor bolts in epoxy.
6. Weld remaining angles to existing base plate.

AS BUILT PLANS
 Contract No. 24-6415B
 Date Completed
 Document No.

422	422	422	422	422	422
422	422	422	422	422	422

SIXTH DISTRICT OF CALIFORNIA - BUSINESS AND TRANSPORTATION AGENCY - DEPARTMENT OF TRANSPORTATION

SAN FRANCISCO-OAKLAND BAY BRIDGE
EARTHQUAKE RESTRAINERS

ROCKER BEARING REPAIR - K1

APPROVED: NOVEMBER 12, 1974

UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE IN FEET AND INCHES.